# SCIENCE.—SUPPLEMENT.

FRIDAY, DECEMBER 25, 1885.

## *THE CANADIAN PLAINS.*

THE name Qu'Appelle, given to the river, charming valley, and village in eastern Assiniboia, long ago settled by half-breeds, and now one of the most productive districts in the north-west, is literally 'Who calls?' It is French for an old Cree appellation, *Kateépwa*, referring to the curious calling or talking noises heard there in winter from beneath the ice. These sounds are most noticeable among the deep coulées near Fort Qu'Appelle, some fifteen miles north of the railway station. The Crees had a separate name, however, for the locality of the Hudson Bay company's trading fort, *Kipáyikinik*, meaning 'closed gates,' and referring to an aboriginal fish-dam at that point. The word 'Manitoba' (which is *not* pronounced Manitobá) signifies 'spirit voices,' and was given to the lake by the Indians on account of the remarkable susceptibility to echoes possessed by the flinty cliffs of its largest island, an echo to all aboriginal minds being the mocking answer of some mischievous spirit.

Just west of Moose Jaw we rise to the top of that great steppe called the Grand Coteau du Missouri, which abruptly separates the drainage of that river from the Saskatchewan's. It is a dry plain, resembling more that of Dakota than any thing seen farther east. It is probably true, as has often been explained, that the reason why the whole valleys of the Assiniboine, Qu'Appelle, and lower Saskatchewan, are not covered with trees, is, that they were annually burned over by the Indians in signalling to one another, or as an aid in guiding and chasing the buffalo. With the extinction of the bison, and the consequent disappearance or concentration of the nomads, forests would re-assert their sway were it not for the new interference of white settlement.

Upon these more arid uplands, tree-growth is not to be expected, and seems never to have existed. Yet they are by no means as dry, nor as barren, as those within the United States. Agriculture succeeds without irrigation all the way between Moose Jaw and the foot of the Rockies, though only a few years ago that area was termed a desert. The one drawback is early frost; but the people are learning how to diminish within a practicable limit the danger from this source. Grant's article in the *Century* for October, 1885, though as a whole inadequate and unsatisfactory, discusses this point pretty well, and shows (what my own later observation bore out) that the railway company's experimental farms produced bountiful crops at intervals all the way from the beginning of the Coteau to the crossing of the South Saskatchewan. The geology of these uplands, and other physical characteristics, are well presented by Dawson, Hind, and other explorers, whose reports have been printed by the Canadian or English governments. Our Pacific railroad reports hold much information and many pictures as to the Coteau, which is not without its beauty.

The characteristic feature in the scenery which constantly interrupts the monotony, and marks another distinction from the 'American' plains, is the great number of lakes. They begin, as seen from the cars, with the Old Wives' lakes,—extensive bodies of water, into which flow several considerable streams from the Cypress Hills, but which have no outlet. These lakes, like most of those which succeed them, are saline. The people there will tell you that this is due to the potash washed into them after prairie fires. It would be easy to argue this out of existence, and show that their salts are sulphates of sodium and magnesium, together with certain chlorides, dissolved out of the marly, cretaceous soil. In many of the smaller lakes the efflorescence of these salts forms a snowy beach, upon which the waters, blue as the sky (or perhaps pale green when the reflection of the azure sky mingles with the yellow bottom shining through), break with a constantly refreshing ripple; and this glittering strand is itself rimmed by a line of richly red samphire, outlined with the vivid emerald of grasses kept fresh by the moisture for a narrow space between the water and the gray plain. Sometimes, late in summer, the salty ponds will partly dry, leaving muddy flats exposed, where a close brilliant carpet of ripe samphire, maroon in color, will overspread the whitened mud; while, in cases where the alkali is excessive, no samphire grows, but the drying-up of the lakelet leaves a wide area of gleaming salt, looking precisely like ice or crusted snow.

The larger ponds are frequented by hosts of herons, gulls, and white pelicans. I have no doubt the last named breed there. The great expanse of sedges, growing in fetid sulphurous mud around its borders, gave the name Rush Lake to one of the largest ponds seen; but this is very unusual,

and due probably to the comparative freshness of the water. I found Limnea campestris, Planorbis trivolvis, a small Gyraulus, and a Physa, on its banks during the halt of the train. Physa does not object to strongly alkaline waters, or to springs of a high temperature, and probably occurs in most of the alkali ponds. Ducks are not common even in the migrating seasons, though one small water-fowl, which seemed to be a grebe, abounded on nearly all the lakes.

The birds of this region have been pretty thoroughly collected by Professor McCoun, who, more than any other naturalist, has travelled over these north-western plains. He made this year a list of no less than 110 species of birds during a rather limited search for alpine plants between Calgary and the Selkirks.

The railway, after crossing the South Saskatchewan, in lat. 50° at Medicine Hat, on a beautiful iron truss bridge built in Pittsburgh, takes a northerly course until it reaches the 51st parallel at Calgary. This is on the outermost edge of the foot-hills of the Rockies, which first come into view at Gleichen, 100 miles away. This was neutral ground between the Plains, Crees, and the Blackfeet; the former wandering northward, and the latter occupying the Cypress Hills and the plains between Bow River and the country of the Bloods and Piegans along the U.S. boundary. On the lower Bow River were located a section of the Blackfoot nation, named Sarcees. The site of Gleichen was known to the trappers in the long-long-ago of the last decade as Blackfoot Crossing. Since then the Bow was easily fordable. Thirty-five miles northward, where the Rosebuds flow into Red Deer River, are the Hand Hills, having bluff faces southward forming the 'Cree look-out.' The Blackfeet, going north in pursuit of buffalo, would be sighted by sentinels posted here, and instantly chased, whereupon a race would ensue back to the Crossing. There may still be discovered remains of intrenchments thrown up by hard-pressed Blackfeet as a defence in fighting off their pursuers until they could get to the safe side of the ford. This borderland of constant struggle ought to yield a rich harvest to the archeologist. How Putnam or Abbott would enjoy following the first plough!

I was told in regard to these Indians (who look and dress precisely like those in Dakota and Montana) something which was new to me; namely, that originally (not through white teaching) they kept a regular police patrol in their villages all night. This consisted of a few young men appointed daily by the chief, whose business it was to see that no one left or entered the village after bed-time without a thorough explanation, and to prevent skylarking or mischief of any kind. This was not a herd-guard or military precaution, but a civil police.

Calgary is advantageously placed at the junction of the Bow and Elbow, — names given by the Indians. It stands upon a gravelly plateau, with no trees in sight save the cottonwoods in the river-bottoms, and with the mountains grandly in view. It is the site of quite a modern post of the Hudson Bay company, which has now abandoned its stockade for a commodious store in town, and it is the headquarters garrison of the mounted police. The horse-training evolutions of this irregular cavalry are very interesting; and one hears remarkable stories of the fidelity and intelligence displayed by these animals during the arduous campaigns, often in the depth of winter, which they often share with their riders. Many a half-frozen trooper's life has been saved by the kindness and courage of his horse. Calgary is a large and growing town.

The winters here are, of course, very severe; the mercury often sinking to — 40° F., and staying below — 20° for weeks together. No one complains, however, except when the wind blows; yet harrowing tales of suffering and death are heard, where men have been caught at some disadvantage. The snow in the foot-hills lies deep, but on the plains disappears rapidly under the influence of the warm, dry wind sweeping up from the great Utah and Columbia basins, which people here erroneously call the Chinook. Cattle feed out all winter among the rolling, partly wood ridges about Fort McCleod, — perhaps the best cattle-region on the continent; but in the neighborhood of Calgary winter feeding is necessary, and as far north as the Red Deer River (a fine summer range) cattle-ranching is considered impracticable on account of the depth of snow. Between Calgary and Fort McCleod the foot-hills are devoted to sheep. Ernest Ingersoll.

## *CARBOLIC ACID AS A DISINFECTANT.*

Of all popular ideas, none seems to be more firmly rooted in the public mind than the notion that carbolic acid is a disinfectant of the most powerful nature. When a disinfectant is wanted, people go to a druggist for some preparation of carbolic acid, and he gives them 'carbol,' or 'carboline,' or 'carbolcine,' or 'carbolic purifying powder,' or some similar thing, which is warranted to be 'the best disinfectant known,' and 'a sure preventive against small-pox, measles, cholera, mumps, diphtheria, whooping-cough,' etc. Then the buyer goes home, sprinkles his carbolic-

acid preparations round, smells a strong smell, and feels safe.

This notion probably arose from the fact that carbolic acid is a very good deodorizer and a very good antiseptic, and that the popular mind has failed to distinguish between these properties and those of a disinfectant. Indeed, it may be said that the scientific mind made the same mistake until the ubiquitous germ theory made its appearance to explain, among other things, just what a disinfectant was. A disinfectant must, according to this theory, be a germicide; and, if it is to be of any use, it must kill the germs quickly, and when used in comparatively small quantities. The question before us is to decide how far carbolic acid fulfils this indication. The first experiments[1] made with a view to answering this question were those of Rosenbach,[2] who, in 1873, showed by experiments on unhealthy pus that a 0.5-per-cent solution of carbolic acid did not act on this substance as a disinfectant, but that a 5-per-cent solution did. About the same time Devaine[3] proved that a 0.5-per-cent solution had no effect on the anthrax bacillus. Similar experiments by Braidwood and Vacher,[4] and Dougall,[5] seem to show conclusively that vaccine virus is not changed when subjected to the prolonged action of a 1-per-cent solution of carbolic acid, and that in some cases it was not affected by a 2-per-cent solution. Sternberg[6] has also shown that nothing less than an 0.8-per-cent could be relied on to destroy the micrococci of pus and septicaemia.

The latest researches on this subject are those of Gärtner and Plagge.[7] These gentlemen, under the supervision of Koch, carried on a careful and elaborate series of experiments on thirteen different species of micrococci, using solutions of 1 per cent, 2 per cent, and 3 per cent. One part of pure culture was shaken up with forty-nine parts of the carbolic-acid solution, and allowed to stand for a longer or shorter time.[8] Then a small portion of the mixture was placed in conditions favorable to growth. It was found that under these circumstances the 1-per-cent solution did not act at all as a germicide, that the 2-per-cent solution failed to kill the germs in two out of the thirteen cases, and that the 3-per-cent solution acted in all cases as a disinfectant. A further series of experiments showed that a 3-per-cent solution of carbolic acid would probably act as an efficient disinfectant when applied to the hands, to surgical instruments, to dressings, etc.

Earlier experiments[1] by the same authors, as well as some of Braidwood and Vacher's experiments, showed that in a gaseous state about 12.5 grams per cubic metre would be needed to disinfect damp clothing, and 15 grams per cubic metre to disinfect dry clothing.

In view of these experiments, it seems very clear that carbolic acid is of no value whatever when used in any ordinary quantities to disinfect sick-rooms, water-closets, clothing, etc., and is of doubtful utility in any case unless the object to be disinfected can be thoroughly soaked in a solution at least as strong as 3 per cent.

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[1] An exhaustive *résumé* of the literature on this subject is to be found in the *Medical news*, xlvi. 317-320.

[2] *Med. record*, viii. 427.

[3] *Comptes rendus*, lxxvii. 821-825.

[4] *Brit. med. assoc.*, Scientific reports, London, 1876.

[5] *Brit. med. journ.*, 1879, ii. 726-728.

[6] *Amer. journ. med. sc.*, lxxxv. 321-344.

[7] *Archiv. klin. chir., Berlin*, xxxii. 403-413.

[8] In the different series of experiments the times were 8, 15, 30, 45 seconds, and 1, 3, and 5 minutes.

## *MALTHUS AND HIS WORK.*

Two recent productions have come to our notice, having for their chief subject the Malthusian theory of population. Mr. Bonar's book[2] contains a painstaking and intelligent account of Malthus' 'Essay on the principle of population,' and the discussions which preceded and followed it; an impartial review of his other writings and controversies; and a brief narrative of his personal life. Mr. Nossig's series of papers[3] presents a pretentious medley of learning unaccompanied by insight, of that arrogance towards old wisdom which a superficial acquaintance with modern knowledge often induces in a shallow mind, and of that amusing species of childishness which manifests itself in writing down formulas having a profoundly mathematical appearance to express obvious truisms or crude scientific fancies.

One cannot help feeling, on reading an article like Nossig's, — written by an educated man, and published in a scientific journal of high standing, — that the way in which the doctrine of Malthus has fared with a considerable part of the reading and writing world is most discreditable to the average human mind. That a doctrine pregnant with the weightiest practical consequences in human affairs should for a century be disputed in every way, — with wisdom and with folly, with logic and with sophistry, by fair means and foul, — is not surprising; but that its opponents should still so often fail to grasp the meaning of the doctrine itself is

[1] Deutsch. verein für oeffentliche gesundh. pflege.

[2] *Malthus and his work*. By JAMES BONAR. London, *Macmillan*, 1885. 8°. (New York, Harper.)

[3] *Ueber die bevölkerung*. By ALFRED NOSSIG. *Kosmos*, 1885.

discouraging and humiliating to any one who has high hopes of the intellectual development of mankind.

Mr. Bonar's book will, it is to be hoped, tend to remove one of the causes of this persistent failure to understand Malthus, which, it is charitable to suppose, has been operative in the case of Mr. Nossig, as it has been in that of better men. The simple task of reading what Malthus wrote is one which his critics have frequently omitted to perform. Mr. Bonar adduces the striking instance of no less a man than Nassau William Senior, who "confessed with penitence that he had trusted more to his ears than to his eyes for a knowledge of Malthusian doctrine, and had written a learned criticism, not of the opinion of Mr. Malthus, but of that which 'the multitudes who have followed, and the few who have endeavored to oppose,' Mr. Malthus assumed to be his opinion." Now, Mr. Bonar's book may be expected to have, in two ways, some effect in removing this kind of ignorance: for, on the one hand, he gives a sufficiently full account, not only of Malthus' theory, but of his book, to show that Malthus had considered the subject from every point of view, and had collected and discussed with pre-eminent sagacity a large array of facts affecting and affected by his doctrine of population; and, on the other hand, his account of the history of the book and its author is calculated to awaken sufficient interest to lead many to read Malthus himself.

A few specimens of Mr. Nossig's work will serve to illustrate its character. "The methods and the economic stand-point of Malthus may be recognized from the way in which he groups the subjects of his investigation. On the one side he places man and his tendency to multiply; on the other, the earth and its productivity. These ideas he isolates, *without recognizing a reciprocal influence between man and the soil.*" It would not be a gross exaggeration to say that there is scarcely a page of Malthus in which this reciprocal influence is not recognized. Malthus continually considers the power of agricultural and social improvement to increase the productivity of a given territory; but he continually insists that it is impossible for this power to keep pace for a long period with the increase of population, which would result from a state of general comfort, without the presence on a large scale of preventive or destructive checks.

Nossig goes on to say that it was in this way easy for Malthus to deduce that "simple mathematical scheme which, among others of his followers, John Stuart Mill accepted. This distinguished thinker, however, who so clearly expounded the difference between the various methods of sociological investigation, . . . overlooked (*hatte übersehen!!*) the fact that his master based his whole theory upon the erroneous geometrical method." The idea of Mill's 'overlooking' the fact that the Malthusian theory, which he accepted, was based upon a method he condemned, is ridiculous. The notion that it *was* based upon the 'geometrical method' has no logical foundation whatever, and has for its sole apparent origin the fact — an unfortunate one, as Malthusians in general will admit — that Malthus gave a conspicuous place in his exposition to a mathematical expression which was intended rather to facilitate the comprehension of the effects with which he was dealing than to convey any thing like an exact statement of the phenomena. But taking the matter at its worst, and supposing (what is thoroughly false) that the contrast of the geometrical increase of population with the arithmetical increase of food were an essential part of the Malthusian doctrine, there is not the faintest trace of the 'geometrical method' in the mode by which Malthus arrived at it. He deduced his law of population from observation of man and the world.

Mr. Nossig finds it no harder to explain Darwin's than Mill's acceptance of Malthus' views: "Darwin was no sociologist, and in the theory of Malthus he saw only a detached item (*moment*) of actual natural relations; hence he accepted it." Space will not permit us to show how Mr. Nossig misapprehends Darwin's own doctrines, and misapplies his misapprehensions to Malthus; but the reader will probably absolve us from the duty of detailed criticism of a writer who thinks he is saying something relevant to the Malthusian problem when he cites the fact that while in two years a human pair can at most double their numbers, a grain of wheat can in the same time be increased a thousand-fold, and thereupon inquires, "Does there, then, actually exist in nature the tendency to make the products which serve for the nourishment of human organisms multiply less rapidly than these organisms?" But if any one thinks that the commission of this favorite *bêtise* of anti-Malthusians is in some way pardonable, he may perhaps find himself able to determine the genus of writers to which Mr. Nossig belongs by the following passage in the constructive portion of his production. In the formulas $E$ denotes the 'evolution' of the human society in question, $g$ denotes the social force of gravitation (or conservatism), and $T$ the force which is 'represented by the struggle for existence:'

"We know that $E = f(T, g)$. Now, $T$ is a function of the reproductive force $R$, which function we shall express by $\phi$, so $T = \phi(R)$: hence $E =$

$f[\phi(R), g]$. Hence it follows that the evolution itself is a function (F) of the reproductive force and the social force of gravitation, $E = F(R, g)$. In consequence of this we may say, conversely, $R = \Psi(E, g)$, where $\Psi$ expresses the function represented by $R$." The last of these equations is marked III, being the third and last of the great formulas arrived at by Mr. Nossig.

We cannot take leave of Mr. Nossig without an apology to our readers for having given him so much space; but our defence is twofold. In the first place, it seemed worth while to stigmatize even so worthless a production when it had been accorded forty pages of space in *Kosmos;* and, secondly, although Nossig's childish endeavors at theory-making serve to expose his incapacity for scientific thought, his criticisms are not unfair specimens of a large part of anti-Malthus literature.

In speaking of Mr. Bonar's book there is less occasion for criticism than for description. It is not intended as an original contribution to the discussion, but as an account of the discussion as it has actually taken place; though, to be sure, there are not wanting passages in which the author gives his own judgment upon the merits of rival arguments. He narrates how Malthus' first essay on population arose out of debates between Malthus and his father on the opinions of William Godwin, and shows how the impression produced by this first essay decided the bent of its author's life, and how the second essay, published five years later (in 1803), differed from the first through being the embodiment of extensive personal observation as well as reading and reflection. This is followed by a detailed account of the larger essay, so far as it relates immediately to the question of population in a narrow sense; and after this we have a summary of Malthus' views on the greatest economic questions, not only as they appeared in his great essay, but also as he presented them in his other works. We shall not attempt to give a summary of a summary, but it may be worth while to direct attention to one or two points which will perhaps be surprising to those who fancy that humanity and moderation are a new thing in political economists. To such men it may sound strange to hear that "to Malthus the discovery of truth was less important than the improvement of society. When an economical truth could not be made a means of improvement, he seems to have lost interest in it." Nor will they be less surprised to learn that he had "the virtue of refusing to join the economical Pharisees, who would not admit the elasticity of economic laws, lest they should discredit their science." And though it is the followers of Ricardo whom Mr. Bonar here designates as the economical Pharisees, one may profitably ponder the words which Mr. Bonar quotes from a letter written by Ricardo to Malthus: "Our differences may, in some respects, I think, be ascribed to your considering my book as more practical than I intended it to be. My object was to elucidate principles; and to do this I imagined strong cases, that I might show the operation of these principles." The misfortune of the matter is not that the critics, but that the followers, of Ricardo imagined his book to be 'more practical than he intended;' and thus it has happened that economists of the present generation, finding as the most conspicuous effect of Ricardian teaching the prevalence of certain practical dogmas, have thought that in exposing the untenableness of these dogmas they were overthrowing the scientific method on which the theory of political economy had been built up.

The last three chapters of Mr. Bonar's book are devoted respectively to Malthus' views in moral and political philosophy, to 'the critics,' and to the biography of Malthus. The chapter on the critics is one of the most interesting in the book. The whole work shows evidence of the most minute and painstaking study: in fact, it would, we are convinced, have been decidedly more useful had the author not been quite so well informed as to the exact changes made in successive editions, and had he omitted many details which were necessary in the time of Malthus, but which are without interest now. The book might, without loss, have been greatly abridged; and, as the main service it will render is to make Malthus more readily accessible, this would have been an important improvement.

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## *THE FORMS OF SHIPS FOR WAR AND FOR PEACE.*

AMONG a collection of very valuable papers recently published by the British institution of civil engineers, is a report of a lecture of exceptional value by the great naval architect, Sir Edward J. Reed. The address was a short one, but very comprehensive. The speaker begins by comparing the conditions affecting the long and the short ship of equal weight-carrying power, showing that the character of the work for which the vessel is intended, and even the nature of the material of which its hull is composed, are circumstances affecting the form of maximum efficiency. The long ship of small wave-making action, but of great friction-producing power, is shown to be best for the case of light hull and heavy loading: the short, broad vessel, on the

other hand, is best for the case of the heavily plated, lightly loaded ship. The heavier the armor, the shorter and broader, proportionately, must be the hull chosen to do the best work. The fact that the shorter and broader, though for a given displacement the lighter, ship demands greater engine-power, brings another complication into the problem; and it is for the naval architect and engineer to seek the form which, on the whole, will be best for his purpose. On the whole, it is found that, for war-vessels, the heavier the armor to be carried, the fuller the form to be chosen: in other words, the value of a ship for purposes of war is not to be judged at all by the magnitude of the so-called 'constant of performance' (cube of the speed, multiplied by the two-thirds power of the displacement, divided by the indicated horse-power). A ship with a high coefficient may be a very bad vessel for war purposes, even though easily propelled through the water. This is a very important principle in naval architecture, and is the more to be kept in view from the fact that it has been customary for many years to judge the value of a design by the magnitude of this constant or some similar quantity. The application of a correct method of comparison shows the Belerophon, a short ship of 300 feet length, to be superior as a war-vessel to the Minotaur, — a ship of 400 feet length, and of much finer form. The smaller ship was 'handier,' attained the same speed, carried an equal battery better protected, had the same engine-power, and cost less than three-quarters as much as the larger. But her coefficient was about 15 per cent lower. This comparison effected a revolution in the naval design of Great Britain. The later iron-clads are built with a length only about five times the breadth, though steaming 16 and 17 knots.

It is found, on carrying out the investigation, that the short, broad ship, which should be given, nevertheless, fine 'entrance' and 'run,' may often be subject to less resistance than a rival craft of greater length and less beam. This was shown by Froude's experiments on the Ajax and a rival form. The magnitude and position of the 'bow wave' relative to the stern of the ship is one of the important modifying conditions. Should that wave take the right position, the resistance may be much less than where it comes in the wrong place. The action of the screw, in relieving the pressure of the water under the stern, is another serious consideration. Froude found, that, if it could be placed one-fourth or one-third the ship's beam from the stern of the vessel, the resistance to propulsion would be very much decreased. The introduction of a lengthened middle body may or may not aid; but no principle or formula has yet been found to determine what the effect will be.

Of the three principal elements of resistance, the friction of the skin of the ship, the wave-making effect, the eddy resistance, the first is usually the greatest. In very fast vessels the second and third may approximate to equality with the first. At low speeds the friction may be nine-tenths the total: at high speeds, such as now are becoming common, the frictional resistance may become as low as one-half the total. Comparing war-vessels, it is seen that fine-lined ships having thick armor would require to be of enormous length, size, cost, and power, while the same offensive and defensive power may be obtained in full-lined ships at much less sacrifice of all desirable qualities.

No insuperable obstacles exist to-day to the production of armored war-vessels capable of defying all the ordnance of the world, and of carrying their own armament at a speed of 18 or 20 knots into the waters of any enemy. The cost of such vessels has become so great, however, that progress in this direction has apparently nearly or quite ceased for the present. The engineer and naval architect is prepared to do his part of the work whenever the nation shall call upon him.

This was the closing lecture of a course covering the general subject of hydromechanics, and was considered a very fitting final address.

## *MEDICAL MISSIONARY WORK IN CHINA.*

In 1881 Dr. Elizabeth Reifsnyder graduated in medicine from the Woman's medical college of Pennsylvania. Two years afterward she went as a medical missionary to Shanghai, where she is in charge of a new and handsome hospital. On Oct. 25, 1884, she performed the first ovariotomy ever done in northern China. The subject was thirty-one years of age, and travelled about five hundred miles to see Dr. Reifsnyder. The tumor weighed thirty-three pounds, and eleven days after the operation the patient sat up.

A successful operation like this soon made her famous, and the Chinese published accounts of the case. From one of these pamphlets the annexed cut is reproduced. It is evidently an ideal sketch by a native artist of great capacity, and vies in its amusing misrepresentation with some of the manufactured conversations of the modern interviewer.

It is *al fresco;* and evidently two passers-by — an Englishman and a Scotchman, to judge by their looks — have been attracted by the sight, and are watching it from the street. But the doctor's attitude and dress are the most amusing things in

the 'composition,' as it may well be called. She is kneeling with one knee on the patient's knees; and her Derby hat, French shoes, train dress, and extraordinary coiffure and earrings would proclaim her rather a devotee of fashion than of science. The assistant, whose left arm is apparently dislocated, and the cheering relics of former patients displayed on the top shelf of the showcase, complete a picture that is unique in medical illustrations, so far as we are familiar with them.

Dr. Mildred M. Philips, in a communication to the Alumnae association of the college, gives a translation of the character seen in the cut, a part of which is as follows: —

"A knowledge of the *Rhyming medical adviser* is considered a sufficient qualification to be a practising physician. Such ignoramuses [as those thus qualified] recklessly prescribe for disease, and ignorantly trifle with men's lives. If a patient dies, it is charged to his fate, and the doctor is not held responsible by the law. If a patient survives, he praises the skill of the doctor."

The article in the pamphlet from which the cut is taken gives a short account of the operation, and then adds, "If this disease had not met with this doctor, it could hardly have been relieved. If this doctor had not met with this disease, who could have known any thing of such divine skill?

"When Chinese doctors hear of this, their tongues will become immovable, and their heads will hang down."

## *DOCTORS AND THEIR WORK.*

ENGLISH medical annals contain many names both familiar and honored the world over. It has not been a difficult matter, therefore, for Mr. Bettany to prepare a fair history[1] of the progress of medical science in England during the past three hundred years. Beginning with Harvey and Sydenham, and ending with Sir James Paget and Sir Joseph Lister, the author has sketched the lives of a succession of scientific men, eminent in the various departments of medicine and surgery, of whom any country may well be proud. It is, perhaps, from such memoirs as these that the history of progress in medicine can be most pleasantly traced. The personal element in science is often neglected, but always repays investigation. And nothing is more entertaining than to notice how the pure scientific spirit in search of facts

[1] *Eminent doctors.* Their lives and their work. By G. T. BETTANY. London, *Hogg*, 1885. 8°.

displayed by one, the clear reasoning powers of another, and the practical mind of a third, all have their place, and combine to produce a result which no one genius alone could have reached. Harvey and Hunter may be selected as types of the first class mentioned, as they were among the earliest to make evident the necessity of an accurate knowledge of the structure of the body as a foundation for all further progress. In the museum which bears Hunter's name is to be found a lasting monument of his influence in impressing upon his contemporaries and successors the need of a wide collection of data for scientific induction. With him may be classed Charles Bell and Marshall Hall, whose careful physiological experiments furnished many of the facts upon which modern theories are based. The reasoning mind which advances from facts to conclusions is exemplified by such men as Bright and Addison and Holland. To put facts together, to balance their comparative importance, to eliminate the non-essential, and thus to reach a logical conclusion, is the work of the diagnostician, — a work which may not bring lasting fame, since it is concerned with individual cases only, but which is none the less important in increasing the sum of general knowledge. It is, perhaps, in the practical application of facts and theories that the English school has been pre-eminent. The names of Astley Cooper, Syme, Jenner, and Lister, will occur naturally in this connection. To Jenner and Lister the race owes a tremendous debt. They have saved, and are to-day saving, the lives of thousands. And it is not only for the methods of vaccination and antiseptic surgery that science is indebted to them: it is for the principle involved in these methods,—the principle of preventive medicine. To cure an individual case may be gratifying, to discover a remedy for a single disease may be beneficial; but to find a means of making the entire race exempt from certain dangerous affections is indeed a triumph. Under Lister's method of antiseptic surgery, operations are daily performed which the boldest of all the surgeons in this list of eminent men would never have ventured to undertake. The history of Lister's discovery is interesting. In 1860 he was put in charge of a new hospital in Glasgow, and, although the most approved principles were employed in its construction, it proved extremely unhealthy. Pyaemia, erysipelas, and hospital gangrene showed themselves, affecting most severely those patients in the wards nearest the ground. Lister noticed, that, when nearly all the beds contained patients with open sores, the diseases which result from hospital atmosphere were sure to be present in an aggravated form; whereas, when a large proportion of the cases had no external wound, these evils were greatly mitigated or entirely absent. He had also been struck with an account of the remarkable effects produced by carbolic acid upon the sewage of the town of Carlisle; the admixture of a very small proportion not only preventing all odor from the lands irrigated with the refuse material, but also destroying the entozoa which usually infest cattle fed upon such pastures. These facts, taken in connection with others which he had ascertained in experiments concerned in proving the germ theory of disease of Pasteur, led him to the idea that if a wound could be closed to the entrance of air, or be kept from all obnoxious influences in the air by the use of carbolic acid, the conditions for rapid healing without the complication of hospital diseases might be fulfilled. From this idea was developed the entire system of antiseptic dressings which bears the name of Lister. From the first experiments in the use of these dressings, a change in surgical procedure began; and now, under their use, wounds which never healed formerly under three or four weeks, are completely healed in six days. Operations which were followed by days of fever and distress are now succeeded by rapid recovery without any surgical fever. Various procedures are daily undertaken which formerly would have been unhesitatingly declared impossible, and pyaemia and hospital gangrene have been almost banished from wards where the system is properly carried out (ii. 141–147).

It would have added to the interest of this book if a large number of details had been given regarding the personal characteristics of the physicians whose lives are sketched. Even without these, however, the book will prove of interest both to those in the medical profession who wish to know something of their English predecessors and contemporaries, and to those outside of the profession who are interested in the history of the progress of science. M. A. S.

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Dr. A. B. Griffiths, of the Manchester technical school, has published the following account of an assay of gold ore from the vicinity of Constantinople: "The gold is disseminated in very small pieces here and there through a quartz and earthy matrix. The ore comes from mines which have not been worked for several centuries, and were thought to be exhausted of gold. The assay, both by dry and wet methods (of a carefully selected sample), gave 3 oz. 14 dwt. of gold per ton of ore. The gold in the ore contains iron and copper, and a very small quantity of silver. The matrix is composed chiefly of quartz, but contains calcium carbonate, ferric oxide, alumina, and lime."

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